

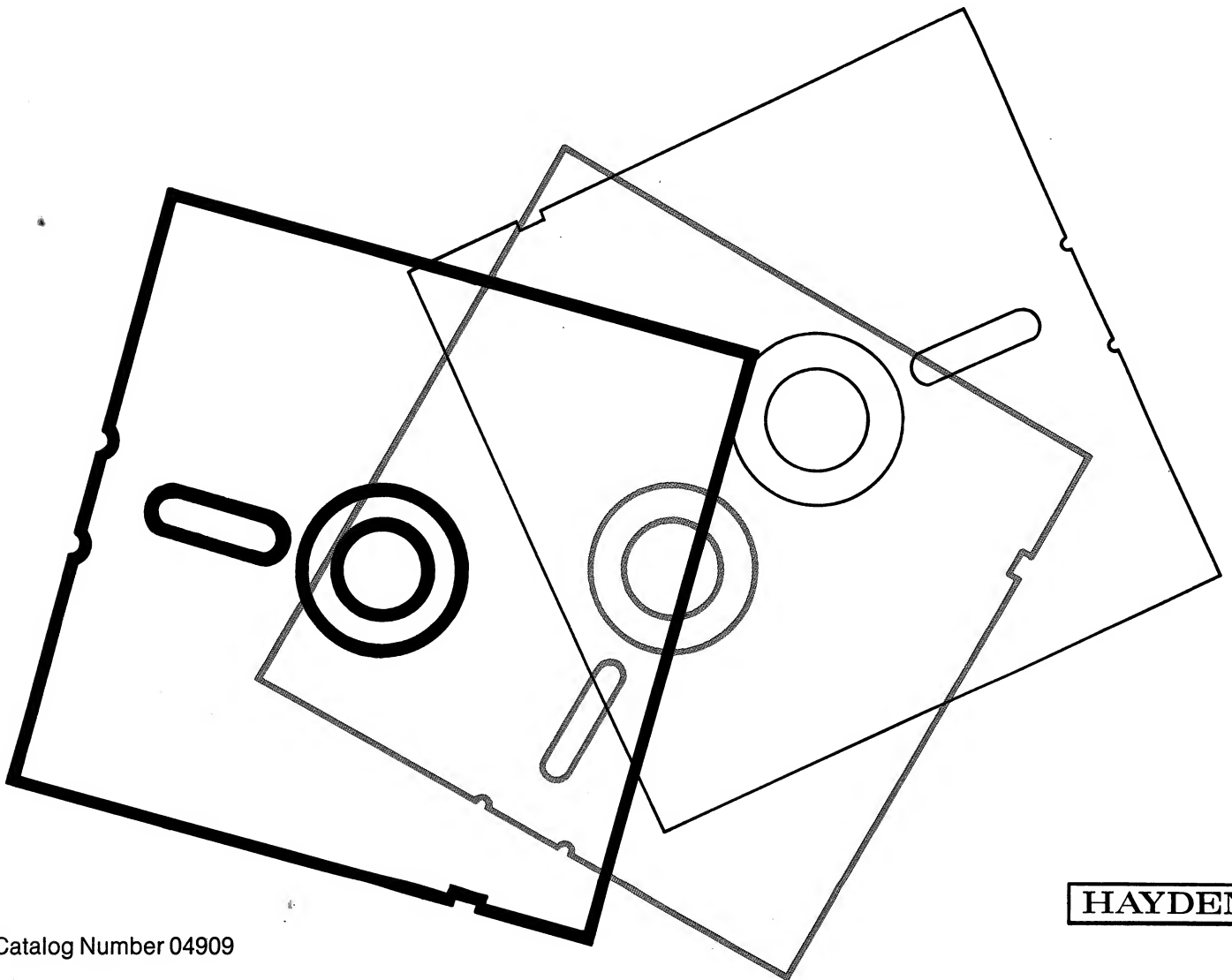
# HAYDEN

Apple II 24K

## MICROCOMPUTER PROGRAM DISKS

### DATA MANAGER: A Data Base Management System and Mailing List

Paul Lutus



**HAYDEN**

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## PART 1

# Introduction

The DATA MANAGER is a computer program that will store, retrieve, and print large amounts of information. The program is used in an Apple II having at least 24K of RAM (Random Access Memory) and one disk drive. It permits the user to enter, edit, alphabetically sort, selectively retrieve, and print information in many formats. The entered information is stored on magnetic diskettes using the Apple II Disk Operating System (DOS).

The program may be used for mailing lists, data banks, recipes, filing systems, or any other purpose where large amounts of data must be stored and quickly recovered. The typical time required for the program to recover a specific item of information is one-half second. Up to 96,000 alphanumeric characters of information may be stored on a single diskette (this is about 19,000 words). One-third of this volume of information may be in the Apple II memory at a time.

For example, a data file has been created that contains the titles, authors, and dates for all *Scientific American* articles for five years. To print a list of all the articles having to do with biology, the user would enter the keyword BIOLOGY. The program then matches this word with the contents of the file, and prints all titles containing the word.

Another example: It is desired to print a mailing list for a single ZIP code area. As in the first example, the user enters the desired ZIP code, and the program finds and prints only the names and addresses for that ZIP code.

Since complete control of a peripheral printer is provided by the program, many types of mailing label sheets or information forms may be used.

## PART 2

# Information Entry and Editing

### STARTING UP

To begin using the DATA MANAGER place the system diskette in the Apple II disk drive and turn on the Apple II. In a moment you will be presented with a menu of options. In these instructions this is called the "Main Menu."


For this example, choose option (N) START NEW FILE. This option is chosen by pressing N, then pressing the RETURN key (NOTE: always press the RETURN key after making a keyboard entry unless directed otherwise). The program will now ask ERASE FILE IN MEMORY (Y/N)?. This warning is given because the (N) option erases any information in the computer's memory as it prepares to receive new information. Respond with Y.

After your response, the computer screen will be blank except for a flashing cursor at the upper left. You are now in the Editor. The Editor is used to enter and edit the information used by the program.

### INTRODUCTION TO EDITING


If you begin typing, the words you type will be entered in the computer's memory and will appear on the screen. Type the following sample entry:

JOHN LAWRENCE ATKINS  
1234 ELM STREET  
FULLMOON, PENNSYLVANIA  
54321

 **LEFT ARROW:** *Character Deletion*—If you make a mistake while typing, press the LEFT ARROW key to remove a single character. This may be done repeatedly. Try it.

**ConTRoL W:** *Word Deletion*—If you want to remove an entire *word* from the screen, press ConTRoL W. (This means to press the ConTRoL key and, while holding it down, press the W key. All ConTRoL keys are gotten this way.) When this has been done, characters to the left of the cursor will be deleted until the cursor comes to a space between characters.

**ConTRoL X:** *Line Deletion*—If you want to delete an entire *line* from the screen, press ConTRoL X. When this has been done, characters to the left and above the cursor will be deleted until the cursor comes to a carriage return.

 **RIGHT ARROW:** *Character Retrieval*—If you make a mistake *correcting* a mistake, and want to get the deleted character(s) back, press the RIGHT ARROW key. This may be done repeatedly. To recover many characters quickly, press the RIGHT ARROW and the REPeaT keys at the same time.

NOTE: the characters, words, and lines deleted by the described editing functions are saved for you and may be gotten back by pressing the RIGHT ARROW key. If more than 256 characters are deleted before any are recovered, the oldest entries will begin to be lost. The most recent 256 characters are always saved for you.

Let's look at our sample entry once again (the position of the cursor is marked □):

```
JOHN LAWRENCE ATKINS
1234 ELM STREET
FULLMOON, TRANSYLVANIA
54321 □ ← cursor
```

*ESCAPE Key: Cursor Control Mode*—Let us say that we have made a mistake typing the person's name. It must be changed to JOHN ATKINS LAWRENCE. But how shall we move the cursor up to the first line without deleting everything in order to get there?

Here is how: press the **ESCAPE** key. The cursor will change from a flashing blank to a flashing + as shown below:

```
JOHN LAWRENCE ATKINS
1234 ELM STREET
FULLMOON, TRANSYLVANIA
54321 + ← cursor
```

The + cursor indicates the *Cursor Control Mode*. This means that the cursor may be moved around the screen without disturbing any of the information displayed there. Here are the keys that move the cursor:

<u>KEY</u>	<u>MOVES CURSOR</u>	
I	up	one line
J	left	one character
K	right	one character
M	down	one line
ConTRoL T	up	12 lines
ConTRoL V	down	12 lines

To move the cursor rapidly, press one of these keys and the **REPeaT** key at the same time.

*Cursor Control Mode Exit*—After you have moved the cursor to the desired new position, press any key *other* than the listed cursor keys and normal typing may resume.

**REVIEW:** To *enter* the Cursor Control mode, press the **ESCAPE** key. The cursor will become +. To *exit* the Cursor Control mode and resume normal typing, press any key *other* than the listed cursor controls. The cursor will become blank.

In the Cursor Control mode, press the I (up) key three times. The cursor will now be located as shown below:

```
JOHN LAWRENCE ATKINS + ← cursor
1234 ELM STREET
FULLMOON, TRANSYLVANIA
54321
```

We now want to delete the word ATKINS and move it to the left of the word LAWRENCE. First, press any key *other* than the cursor control keys to re-enter the normal typing mode. This will make the cursor go blank. Then, press **ConTRoL W** (delete a word). This will delete the word ATKINS. The example should now look like this:

```
JOHN LAWRENCE □ ← cursor
1234 ELM STREET
FULLMOON, TRANSYLVANIA
54321
```

Now the word ATKINS has been saved, and may be moved anywhere we want. To place it to the left of the word LAWRENCE, press the ESCape key, then press J (move left) nine times. The example should now look like this:

```
JOHN + LAWRENCE
1234 ELM STREET
FULLMOON, TRANSYLVANIA
54321
```

Now press the **RIGHT ARROW** key repeatedly to bring the word ATKINS out onto the screen. The word LAWRENCE will automatically be pushed to the right as you do so.

**REVIEW:** To move text from place to place on the screen (1) delete the text, using the **LEFT ARROW**, **ConTRoL W**, or **ConTRoL X** features, (2) move the cursor to the new position using the **ESCape** key Cursor Control mode, then (3) restore the text, using the **RIGHT ARROW** key.

By using these methods you may insert or delete words or lines and move them about on the screen.

## ADVANCED EDITING

There are some data processing terms used in the next section that must be defined:

1. The information typed into the Apple II memory is called a "file."
2. Each item of information (such as a name and address) is called a "record."
3. Each line (displayed on the computer screen) of the record is called a "field."

**ConTRoL R: Record Marker**—If you have created a long file, most of which is off the screen at any time, simply use the cursor controls to scroll the desired text back onto the screen. The text will scroll up or down as required by the cursor controls.

Because a file may be a large number of individual records, there must be a way to segregate the items from one another. There is a special marker that is used for this purpose. This marker is gotten by pressing **ConTRoL R** (R = Record). If you press **ConTRoL R**, an inverse (black on white) asterisk will appear. *This marker must begin each new record!* The marker is not printed at the peripheral printer.

Here is a sample file, with the elements identified (the record markers are included):

```
file { *JOHN LAWRENCE ATKINS
      1234 ELM STREET
      FULLMOON, TRANSYLVANIA ← field
      54321
      *SUSAN B. ANTHONY }
      10203 WARREN COURT ← record
      SUBLIME, TEXAS
      12345
      *REGIS T. REX
      804 ARROYO REAL
      KINGSLAND, OKLAHOMA
      30205
```

**Record Length**—The maximum allowable length for an individual record is 256 characters. This is about six display lines (each 40 characters long) on the computer screen. If the lines of information being typed in are not 40 characters long, more lines may be entered. For example, if the lines are half this length on the average, 12 lines may be entered in a single record.

*Fields*—Each entered line is called a field. A record may have any number of fields as long as the maximum record size described above is not exceeded. It is permitted to enter fields *longer* than 40 characters. The field will have split words on the Apple II screen, but will be printed correctly if the printer is capable of the line length.

*Special Fields*—It is permitted to enter information that will not be printed (unless specifically requested) on a peripheral printer, although it will be displayed on the computer screen in the usual way. This feature makes it possible to create a combination address/telephone list and print only the address information for a mailing list.

This feature can also be used to create a place holder in an address with no company name, so that a ZIP sort will be carried out correctly, but the printed address won't have a blank line. Another way to use this feature is to include special information in the record without interfering with the printing of data for wide distribution. Example:

```
*HARRY J.  
VANDERBILT  
;NO COMPANY NAME  
123 CORPULENCE CT.  
PECUNIARY, PA.  
54321  
;THIS DUDE IS RICH  
;(203 123-4567
```

Unless specifically requested in the printer options, the information on the lines containing the semicolons (;) will not be printed, and the printing will continue on the following line.

*ConTRoLs B and E: Jump to file beginning or end*—You may want to jump to the beginning or end of the file, without using the Cursor Control mode to get there. To do this use the following: **ConTRoL B** jumps to the beginning of the file and **ConTRoL E** jumps to the end.

*ConTRoL S: String Search*—As developed files get lengthier, it will become harder and harder to find specific positions where editing is needed. The String Search feature automatically finds and displays cases of an entered character, word, or phrase (called a "string"). To use this feature press **ConTRoL S**. The program will ask for the search string.

After you have entered the string the program will search for and display examples of it in the file. If you want to continue searching, press the **RETURN** key. If you want to make entries at the displayed point, press any key *other* than **RETURN**, and the normal typing mode will be in effect.

**NOTE:** The string search feature searches *downward* (forward in the file) from the beginning cursor position for examples of the string. If you want to see all examples of the string in the file, you must jump to the file beginning first.

At the end of the string search a bell will ring and the program will return to the original cursor position. If the bell rings on the first display after string entry, this means that no cases of the string were found.

**NOTE:** This string search feature should be used for editing only. For normal data searches use the (F) function of the Main Menu instead. It is faster and has the ability to print as well as display results.

*ConTRoL C: Count Records*—This feature counts the records (each beginning with the **ConTRoL R** record marker) and displays the total. The cursor position is not important; all records are included in the count.

*ConTRoL F: Free Memory*—This feature gives the number of characters of memory space left in the file. It is not good practice to fill a file completely before starting another because future small additions and editing may cause a memory overflow.

*ConTRoL D: Disk Operating System Commands*—This feature, which is also available from the Main Menu, permits DOS commands to be entered by pressing **ConTRoL D**, then the **RETURN** key.

*ConTRoL Q: Quit Editor*—This control exits the editor and returns to the Main Menu.

## SAVING A FILE TO DISK

The file in the Apple II memory will be lost if power is turned off, and might be lost as a result of a number of other circumstances. Saving the file to disk protects against this. Do this periodically so that a quick recovery from memory loss may be made. It is a good idea to save important files on more than one disk.

To save the file in memory, choose Main Menu option **(S) SAVE TO DISK**. The program will ask for a file name under which to save the file. If a file has previously been loaded or saved, that file's name will be displayed. If you want to use the old file name, simply press the **RIGHT ARROW** key repeatedly to capture the name, then press the **RETURN** key. If you want to use a new name, type in this name instead.

The saved file will have the prefix **TEXT.** automatically added to the file name for identification purposes. This prefix does not need to be added by the user.

You may want to specify a disk drive and slot to which the file is to be saved (used in systems having more than one disk drive). To do this use the following entry format:

[file name] ,s [slot number] ,d [drive number]

*Loading a File from Disk*—To load a file from disk, choose Main Menu option **(L) LOAD FROM DISK**. Enter the desired file name as described above. The loaded file will erase any information presently in memory.



## PART 3

# Sorting the File Alphanumerically

In order for the file to be correctly sorted, some conditions must be met:

1. Each record in the file must be less than 256 characters in length (about six full-width printed lines on the Apple II display, 12 half-width, etc.).
2. Each record must begin with the **ConTRoL R** record marker.
3. In sorts requiring sequential field examination (to be described), all records must have at least as many fields as the largest specified number. Example: if field 5 is to be examined during the sort, and one record doesn't have 5 fields, the sort will halt.

To sort the file, choose Main Menu option **(A) ALPHASORT FILE**.

### **SORT DEPTH SPECIFICATION**

The program will prompt as follows:

ENTER NUMBER OF  
CHARACTERS TO BE COMPARED  
(DEFAULT = 8, QUIT = "Q"):

This option selects the depth in characters used to compare records. For example, if **WILSON** and **WILLIAMS** appeared in the file, and a sort depth of 3 were chosen, the program would disregard the letters to the right of **WIL** and the names wouldn't necessarily appear in the right order.

Sorts conducted with large specified depths take a little longer but are usually worth the time if many names (or other data) in the file are similar. If no entry is made in this option, a default depth of eight characters will be chosen. If you want to escape from the Alphasort routine and return to the Main Menu, enter a **Q** instead of a number.

### **FIELD SORT SEQUENCE**

After choosing a sort depth you are permitted to choose the order of fields to be sorted. For example, let us say you have selected the Name and Address Entry Format:

JOHN LAWRENCE	←	field 1
ATKINS	←	field 2
;NO COMPANY NAME	←	field 3
1234 ELM STREET	←	field 4
FULLMOON, TRANSYLVANIA	←	field 5
54321	←	field 6

**NOTE:** The format shown is a good choice for mailing lists because it allows the program to sort first and last names separately. A printing option (see section IV, "Data Retrieval and Printing") then makes the first and last names appear on the same line.

Let us say that you wanted to sort:

1. ZIP codes first,
2. Last names,
3. First names, then
4. Street address.

The program prompt to select sort field sequence looks like this:

```
ENTER SORT FIELD 01
(NO ENTRY = BEGIN SORT, QUIT = "Q") :
```

The program is asking for the *order of importance* of the fields in the record. Since we have decided that ZIP codes (field number 6) are most important, we enter (6) first, then the last name field (2), then the first name field (1), then the street address field (4). If we made these entries, the computer screen would look like this:

```
ENTER SORT FIELD 01
(NO ENTRY = BEGIN SORT, QUIT = "Q") :6
ENTER SORT FIELD 02
(NO ENTRY = BEGIN SORT, QUIT = "Q") :2
ENTER SORT FIELD 03
(NO ENTRY = BEGIN SORT, QUIT = "Q") :1
ENTER SORT FIELD 04
(NO ENTRY = BEGIN SORT, QUIT = "Q") :4
ENTER SORT FIELD 05
(NO ENTRY = BEGIN SORT, QUIT = "Q") :□
```

It isn't required to specify this many fields, but a minimum of one field number must be entered. After the last field number has been entered simply press the **RETURN** key without making any entry and the sort will begin. If any records are longer than 256 characters, or if there is a record that doesn't have enough fields, that record will be printed with an error message and the sort will halt. If such an error appears, simply return to the Editor, correct the fault, and begin the sort again.

## **SORT TIME**

In the absence of such errors, an average sort will take about four minutes, depending on file length. A worst-case sort of a full file that is completely out of order is 15 minutes.

DO NOT press the **RESET** key to escape the Alphasort routine. This will almost certainly scramble memory contents. When the sort is complete, the sorted file may be saved to disk.

## **DATE ENTRY FORMAT**

If a date is to be one of the record entries and is to be used as a sort field, the following entry format must be used to ensure a correct sort:

1. The date must be completely numeric.
2. The order of entry is year, month, day.
3. If a day or month number has only one digit, a leading zero must be inserted.
4. Examples:

June 16, 1979	:	79	06	16
February 4, 1948	:	48	02	04
December 29, 1908	:	08	12	29

## PART 4

# Data Retrieval and Printing

### FINDING DATA IN THE FILE

To use this option, choose **(F) FIND DATA IN MEMORY** from the Main Menu. This option is used to search for and display information from the file in memory and is also used in conjunction with the printer options (to be described) to selectively print file information on a peripheral printer.

After you have chosen this option you will be asked for a search string (see “**ConTRoL S: String Search**” in Part II, Editing). The selectiveness of the search is governed by the length of the search string. Example:

1. If you enter **JONES** as the search string, you will retrieve any records having the string **JONES**.
2. If you enter **JO**, you will retrieve any records having **JO** as part of one or more words, so that records containing **JOSEPH**, **JOANN**, and even **MAJOR** will be printed.
3. For full file display or printing enter a single space as the search string and the entire file will be printed (except for records with no spaces in them).

There are many techniques born of experience that will improve your ability to quickly find the desired information and filter out undesired records. For example, if you know that the key characters appear at the beginning of a word, precede your search string with a space (unless the word is likely to appear at the beginning of a line). The same method may be used in reverse if it is known that the key characters will appear at a word ending.

Another way to identify information is to place “flags” in comment fields (fields with “;”). These flags may then be sought and records will be displayed or printed based on special information that itself is not printed. Example: for the search, you enter **;\***

The program then displays or prints only records that have these characters in a field. This makes it possible to have special codes for printing. The codes themselves won’t be printed unless specifically requested (see “**Special Fields**” in Part II, Editing).

### PRINTING THE FILE

All data displayed on the computer screen in the **(F) FIND DATA IN MEMORY** option will also be printed at a peripheral printer. To prepare for the printing connect the printer (with power turned off) to the Apple II through the correct printer interface card. Make a note of the Apple II peripheral slot into which the card is inserted.

Now run the **DATA MANAGER** and select Main Menu option **(P) SET PRINT MODE**. You will be prompted for a printer address. This depends on the Apple II peripheral slot into which the printer interface card is inserted. Select the address from the table below:

<u>PERIPHERAL SLOT</u>	<u>ADDRESS</u>
1	C100
2	C200
3	C300
4	C400
5	C500
6	C600
7	C700

Other addresses may be entered for special applications. After this entry has been made, two more choices are presented: NAME PRINT OPTION (Y/N)?

If selected, this option prints the first two fields of each record as one. This makes it possible to enter (and sort) first and last names separately but print them together. For example, in using this option, the following record:

\*JOHN LAWRENCE  
ATKINS  
1234 ELM STREET  
FULLMOON, TRANSYLVANIA  
54321

will be printed as:

JOHN LAWRENCE ATKINS  
1234 ELM STREET  
FULLMOON, TRANSYLVANIA  
54321

The next option to be presented is: PRINT TO RIGHT OF ';' (Y/N)?

If selected, this option prints field segments not normally printed (see "Special Fields" in Part II, Editing).

After the printer address has been entered and these two options examined, the printing mode is enabled. All records found using option <F> FIND DATA IN MEMORY will be printed at the peripheral printer.

NOTE: To disable the printing mode, select <C> CLEAR PRINT MODE. This option has no prompt. If an option that accesses the DOS is used, this will automatically disable the printing mode.

## CHANGING PRINT CONSTANTS

Printing format is set by the program. The following values are used:

PAGE INTERVAL: 66  
RECORD INTERVAL: 6  
RECORDS PER PAGE: 10  
LEFT MARGIN: 5

If these values must be changed, select Main Menu option <R> RESET PRINT CONSTANTS. The constants and their present values will be printed (one by one) as shown.

PAGE INTERVAL selects the number of printed lines between one page top and the next. This value is almost always 66 when 11-inch sheets are used.

RECORD INTERVAL is the distance in lines between the beginning of one record (label) and the next.

RECORDS PER PAGE selects the number of records (labels) to be printed before the printer goes to the top of the next page. This prevents printing across the partition between sheets in computer fanfold paper.

In cases where rolls of mailing labels are to be printed or there are no page splits between labels it is possible to adjust the previous numbers so that no page splits occur. Simply set the PAGE INTERVAL to the RECORD INTERVAL. In this case, any nonzero value for RECORDS PER PAGE will be accepted.

LEFT MARGIN is used to horizontally adjust the printing on the label or page. This feature may be used to print columns of labels by moving successively to the right across a label matrix sheet.

If no entry is made for one of these constants, the previous value will be retained. Therefore, you may check the present print constant values by selecting option <R> and examining the numeric values without making any entries. Selecting this option will not clear the printing mode if previously set. Printing constants may be changed while printing is underway between sets of data found with option <F>.

## CREATING A SUB-FILE

An additional feature of the DATA MANAGER is that once a file has been created and stored on disk it is possible to extract certain records from that file selectively and store them in a separate file. For example, once a mailing list has been made up using the DATA MANAGER it would then be possible to create a separate file, from information in the main file, that contained only the names and addresses of people that live in New York.

To do this, you must save your main file out to disk with the <S> option if you haven't already done this. Then exit the DATA MANAGER program by typing Q (for quit). Next type in the command BRUN CONVERTER. This will activate the File Converter program, which will read the data file and extract the desired records. When the File Converter program is run, you will be presented with a menu of options as below:

### OPTIONS

- <L> LOAD FILE
- <C> CONVERT FILE
- <S> SAVE FILE
- <Q> QUIT PROGRAM

The first thing to do is to enter an L so that you can load the main file into memory. When this option is selected, you will then be asked to enter the name of the file from which the extraction of data will be done. After the file has been read into memory, the next thing to do is to select option <C>, which will then ask you for the search string to be used. If you wanted to create a file with the names and addresses of all of the people on your list who have the name Smith, then SMITH would be entered as your search string. After you have built up your sub-file, it can then be saved to disk by entering an S and the file name you want it saved under.

## APPENDIX A

### Short - Form Listing of Editor ConTRoLs and Functions

Cursor Control (ESCAPE key): Cursor becomes +

<u>KEY</u>	<u>MOVES CURSOR</u>	
I	up	one line
J	left	one character
K	right	one character
M	down	one line
ConTRoL T	up	12 lines
ConTRoL V	down	12 lines

ConTRoL B (B = Beginning) jumps to file beginning.

ConTRoL E (E = End) jumps to file end.

LEFT ARROW deletes character to left of cursor.

ConTRoL W (W = Word) deletes word to left of cursor.

ConTRoL X (they can't all be gems) deletes line to left of cursor.

RIGHT ARROW retrieves characters deleted by above functions.

ConTRoL F (F = Free Memory) gives remaining free memory.

ConTRoL C (C = Count) counts and displays present number of records.

ConTRoL S (S = String Search) searches file for entered string.

ConTRoL D (D = DOS) accepts Disk Operating System command.

ConTRoL Q (Q = Quit) returns to Main Menu.

## APPENDIX B

### **Error Recovery**

There are a number of things that may cause the program to stop running. Among these are DOS errors, pressing the **RESET** key or unintentionally typing **Q** at the Main Menu. In general, the first two of these errors will not cause the program to stop running. After the program has been exited by pressing **Q** the disk must be re-booted to begin again, and this wipes out the file in memory. Therefore, save your file frequently, and don't quit the program without having saved your file.



## APPENDIX C

### Serial Interface Option

**NOTE:** The following is a technical note that has no direct bearing on the operation of the DATA MANAGER.

A method is included on the DATA MANAGER Master diskette to connect a 1200-baud serial printer directly to the Apple II game I/O connector. This has the advantage of saving the cost of a peripheral printer interface card.

**WARNING AND DISCLAIMER:** Because the connection requires technical skill on the part of the user, do not undertake to make the connection unless you have such skills or can obtain technical assistance. Damage to the printer and/or the Apple II may result from incorrect connection. In no event shall the author or his distributor be liable for incidental or consequential damages arising from the use of this option.

Electrical interface is at standard TTL levels. The following gives the functions and connection points:

Function .....	Apple II Game I/O Pin
Data (from Apple) .....	15
Read Ready (from printer), .....	2
Signal Ground .....	8

To use the interface, proceed in the following way:

1. From the Main Menu, hit **ConTRoL D**, then the **RETURN** key.
2. Type **BLOAD SERIAL**.
3. From the Main Menu, choose a printer address (option **<P>**) of **2B0**.

The serial interface is now enabled. Printing will commence in the usual way and can be terminated in the usual way.

# Data Manager

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## ***DATA MANAGER: An electronic log book, index file, and record clerk — all in one.***

DATA MANAGER is a Data Base Management System and Mailing List that will allow you to store, retrieve, and sort information of any kind on an Apple II with a disk drive. Names and addresses, customer or patient records, dietary information, inventories, recipes or any other type of information can be entered into the DATA MANAGER and stored on disk. It can later be retrieved and either viewed on the video screen or in hard copy form on your printer. DATA MANAGER can also be used to create addressed labels for bulk mailings. Written in 6502 machine code for the Apple II, DATA MANAGER was designed with the emphasis on speed, dexterity, and efficiency. This program is an information processor and collator, an electronic log book, a sophisticated index file, and a record clerk all in one.

### ***Features***

- Written in 6502 machine language.
- Superfast multiple field sort.
- Superfast selective retrieval on any field.
- High storage efficiency.
- Cross reference vast amounts of data in seconds.
- Built-in editor easily allows changes in stored information.
- User definable record format. Will handle structured or free-form information.
- Produces on-screen or hard copy reports.
- Able to create sub-files that contain only the information you require.
- Built-in 1200 baud software serial interface with handshaking. Connect a serial printer via the game paddle connector, eliminating the need for an expensive serial interface card.
- Written specifically for the Apple II.
- Complete with a documentation manual that gives complete explanations and instructions for beginners.
- Packaged in protective three-ring binder with antistatic disk holder.

### ***Specifications***

**System Requirements:** DATA MANAGER requires an Apple II or Apple II Plus using DOS 3.2 (or earlier), at least 24K RAM and one or more disk drives. DATA MANAGER can also interface with any standard printer.

**Storage Abilities:** DATA MANAGER can store up to 96,000 characters on a single diskette. Additional disk drives can be connected to the system and easily accessed for additional storage or retrieval.